WASTE AND WATER MANAGEMENT
IN CROATIA

FLANDERS INVESTMENT & TRADE MARKET SURVEY
WASTE AND WATER MANAGEMENT IN CROATIA
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GLOSSARY OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>CARDS</td>
<td>Community Assistance for Reconstruction, Development and Stabilization</td>
</tr>
<tr>
<td>CBS</td>
<td>Central Bureau of Statistics</td>
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<td>CEA</td>
<td>Croatian Environment Agency</td>
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<tr>
<td>CFCA</td>
<td>Central Finance and Contracting Agency for EU Programmes and Projects</td>
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<td>CW</td>
<td>Croatian Waters</td>
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<tr>
<td>EBRD</td>
<td>European Bank for Reconstruction and Development</td>
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<tr>
<td>EC</td>
<td>European Commission</td>
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<tr>
<td>EEA</td>
<td>European Environment Agency</td>
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<tr>
<td>EIRR</td>
<td>Economic internal rate of return</td>
</tr>
<tr>
<td>EPEEF</td>
<td>The Environmental Protection And Energy Efficiency Fund</td>
</tr>
<tr>
<td>EPOP</td>
<td>Environmental Protection Operational Programme</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>EUROSTAT</td>
<td>Statistical Office of the European Communities</td>
</tr>
<tr>
<td>IPA</td>
<td>Instrument for Pre-Accession Assistance</td>
</tr>
<tr>
<td>MAFWM</td>
<td>Ministry of Agriculture, Forestry and Water Management</td>
</tr>
<tr>
<td>MEPPPC</td>
<td>Ministry of Environmental Protection, Physical Planning and Construction</td>
</tr>
<tr>
<td>NES</td>
<td>National Environmental Strategy</td>
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<tr>
<td>NWMS</td>
<td>National Water Management Strategy</td>
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<tr>
<td>NEAP</td>
<td>National Environmental Action Plan</td>
</tr>
<tr>
<td>OG</td>
<td>Official Gazette</td>
</tr>
<tr>
<td>OP</td>
<td>Operational Programme</td>
</tr>
<tr>
<td>PA</td>
<td>Priority axes</td>
</tr>
<tr>
<td>PEP</td>
<td>Pre-accession Economic Programme</td>
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<tr>
<td>REReP</td>
<td>Regional Environmental Reconstruction Programme</td>
</tr>
<tr>
<td>RWMC</td>
<td>Regional Waste Management Centre</td>
</tr>
<tr>
<td>SDF</td>
<td>Strategic Development Framework for 2006-2013</td>
</tr>
<tr>
<td>WFD</td>
<td>Water Framework Directive</td>
</tr>
<tr>
<td>WMC</td>
<td>Waste Management Centre</td>
</tr>
<tr>
<td>WMS</td>
<td>Waste Management Strategy</td>
</tr>
<tr>
<td>WWTP</td>
<td>Waste Water Treatment plant</td>
</tr>
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</table>
1. CROATIA’S OVERVIEW

Croatia is a Central Eastern European country of 4.2 million inhabitants. Its major cities are Zagreb, Split, Rijeka and Osijek. The country has borders with Slovenia and Hungary to the North, Bosnia and Herzegovina to the Southeast, Serbia and Montenegro to the East. It was part of the Socialist Federal Republic of Yugoslavia until 1991, when the country became independent and adopted a parliamentary democracy. Croatia has significant natural endowments and a long business tradition in a wide range of sectors. Since that time, Croatia has enjoyed a decent growth with a sustained increasing GDP of 4% to 5% per year until the great recession and stable macroeconomic factors like low inflation rate and a low kuna/euro rate (7.58)- kuna/USD rate (6.82). However, the great recession had severe consequences for the Croatian economy. As a result of the global economic recession, GDP decreased in 2009 by 6%.

However, today in Croatia, GDP in Q2 2018 went up by 2.8% y-o-y, while in Q1 the growth rate was 2.6% compared to the same period in 2017.

The unemployment rate in Croatia decreased to 8.4 percent in September from 8.5 percent in August of 2018. The unemployment rate in Croatia averaged 17.46 percent from 1996 until 2018, reaching an all-time high of 23.6% in January of 2002 and a record low of 8.4% in September of 2018 (https://tradingeconomics.com/croatia/unemployment-rate).

The inflation remains stable and under control (estimated for 2017: 1.1%). The annual inflation rate in Croatia went down to 1.4% in September 2018 from 2.1% in the previous month. (https://tradingeconomics.com/croatia/inflation-cpi)

In 2017, 47.352 persons have emigrated from Croatia, 95.8% were Croatian citizens and 4.2% foreigners. Out of the total number of emigrants from the Republic of Croatia, 61.4% departed to Germany. (https://www.dzs.hr/Hrv_Eng/publication/2018/07-01-02_01_2018.htm)
To conclude, the country still has some challenges to face in the future, including unemployment, heavy dependence on tourism and hospitality, a growing trade deficit and growing external debt and emigration.

Croatia became a full member of the European Union on the 1st of July 2013. Croatia is also a member of the Council of Europe, NATO, United Nations and the World Trade Organization (WTO).

2. ECONOMIC INDICATORS

<table>
<thead>
<tr>
<th>Economic Index</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>4,246,700¹</td>
</tr>
<tr>
<td>Human Development Index (IDH)</td>
<td>0.831²</td>
</tr>
<tr>
<td>GDP</td>
<td>€ 47.40 billion</td>
</tr>
<tr>
<td>GDP (per capita)</td>
<td>€ 11,810³</td>
</tr>
<tr>
<td>Inflation Rate</td>
<td>1.4 %</td>
</tr>
<tr>
<td>Average Monthly Salary (gross)</td>
<td>€ 1086</td>
</tr>
<tr>
<td>Average Monthly Salary (NET)</td>
<td>€ 980</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>8.5%</td>
</tr>
<tr>
<td>Export, EUR</td>
<td>€ 14.16 billion</td>
</tr>
<tr>
<td>Import, EUR</td>
<td>€ 21.98 billion</td>
</tr>
<tr>
<td>Global Competitiveness Index</td>
<td>4.19</td>
</tr>
<tr>
<td>Gross external debt, mln EUR</td>
<td>€ 46748.98</td>
</tr>
<tr>
<td>Main Commercial Partners</td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td></td>
</tr>
<tr>
<td>Bosnia and Herzegovina</td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td></td>
</tr>
<tr>
<td>Slovenia</td>
<td></td>
</tr>
<tr>
<td>Austria</td>
<td></td>
</tr>
<tr>
<td>Currency</td>
<td>kuna (HRK)</td>
</tr>
<tr>
<td>Average Exchange Rate/Euro</td>
<td>7.42141HRK</td>
</tr>
<tr>
<td>Average Exchange Rate/Dollar</td>
<td>6.428296 HRK</td>
</tr>
</tbody>
</table>

Table 1: Croatia’s Economic Indicators

¹ [http://www.dzs.hr/Hrv_Eng/publication/2012/SI-1469.pdf](http://www.dzs.hr/Hrv_Eng/publication/2012/SI-1469.pdf)
³ [http://www.indexmundi.com/croatia/gdp_composition_by_sector.html](http://www.indexmundi.com/croatia/gdp_composition_by_sector.html)
⁴ [http://www.dzs.hr/Hrv/system/first_results.htm](http://www.dzs.hr/Hrv/system/first_results.htm)
3. INTRODUCTION

3.1 CROATIA AND THE ENVIRONMENT

The natural environment is one of the most important assets in Croatia’s economy; it is one of the main drivers of economic development, given its essential role in the tourism industry. The country has a well-preserved environment mainly due to the absence of heavy industrial pollution over recent years; it is distinguished by a great biological and geographical diversity and has relatively abundant fresh water supplies. However, the level of environmental protection is generally lower than in the EU.

From the 1990’s, Croatia has been slowly but surely progressing, which is partly the result of its highly attractive natural environment and the generation of tourism revenue, but it also reflects the increased private consumption and investment. Paradoxically, this places increasing demands on Croatia’s environmental infrastructure, presenting a set of challenges that need to be managed efficiently and effectively. In particular, there is an increasing demand for high quality and reliable environmental services: water supply and the disposal of waste water, the management of solid waste, retaining a clean air environment and preserving the natural habitat. The ongoing fiscal consolidation and planned policy measures to reduce public debt mean that public resources for investment in modernizing and maintaining infrastructure must be carefully managed to maximize effective spending and value for money. This emphasizes the importance of well-founded environmental strategies, the prioritization and sequencing of infrastructure projects, and maximizing the contribution of funding sources.

Sustainable development offers to each country and at a global level, a positive long-term vision of a society that is more prosperous and more just, and which promises a cleaner, safer, healthier environment - a society which delivers a better quality of life for us, our children and future generations. Achieving this in practice requires that economic growth supports social progress and respects the environment. Environmental protection requirements must be integrated into all relevant sectorial policy areas (transport, energy, agriculture, tourism, etc.). This means that environmental protection should be an integral part of transport infrastructure development, as well as of energy, agriculture, and industrial development.

Besides the preservation of the biological and geographical diversity, the Adriatic seacoast and islands and the corresponding municipal infrastructure, such as water supply, sewage and waste water treatment infrastructure and waste infrastructure, are preconditions for the long term development of tourism and overall development. The key facet of environmental protection is environmental management which is, in-turn, multi-faceted, covering a wide range of complex and interlinked sectors and activities – water and waste management, air pollution, natural habitat/nature protection, biodiversity, noise, industrial pollution, and chemicals. Sustainable development is therefore integral to Croatia’s environmental policy and strategy framework.
In the introduction to the National Environmental Strategy it is stated that the concept of sustainable development should become a predominant determinant of the development strategy of the Republic of Croatia which will enable to the future of environmental protection to be seen in a different way and in a much wider context than earlier.

The Report of the State of the Environment (http://www.haop.hr/sites/default/files/uploads/specificni-dokumenti/o_nama/izvje%C5%A1%C4%87e%20radu%20HAOPa%20za%202017%20godinu.pdf) gives a deeper insight in the current situation of waste and water management in Croatia. The problem is that Croatia still does not have an efficient way of re-using waste and therefore loses a lot in economic sense. The situation with water is not much better. There is a significant loss of water in the public sector supply.

### 3.2 CROATIAN ENVIRONMENTAL STRATEGY FRAMEWORK

Croatia became a party to the UN Framework Convention on Climate Change (UNFCCC) in 1996. As a country with an economy in transition it enveloped the responsibilities under Annex I of the Convention. The Republic of Croatia signed the Kyoto Protocol in 1999. After its ratification by the Croatian Parliament the Republic of Croatia reduced the greenhouse gas emissions by 5% in the first commitment period between 2008 and 2012 in relation to the base year. In the “Post – Kyoto” period gas emissions should be reduced by 20%.

The First Croatian National Communication under the UN Framework Convention on Climate Change was submitted to the Convention Secretariat in 2002. (http://unfccc.int/resource/docs/natc/hrvnc4.pdf)

With 197 Parties, the United Nations Framework Convention on Climate Change (UNFCCC) has near universal membership and is the parent treaty of the 2015 Paris Climate Change Agreement. The main aim of the Paris Agreement is to keep a global average temperature rise this century well below 2 degrees Celsius and to drive efforts to limit the temperature increase even further to 1.5 degrees Celsius above pre-industrial levels. The UNFCCC is also the parent treaty of the 1997 Kyoto Protocol. The ultimate objective of all agreements under the UNFCCC is to stabilize greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system, in a time frame which allows ecosystems to adapt naturally and enables sustainable development. (https://unfccc.int/index.php/news/un-climate-change-conference-2017-aims-for-further-faster-ambition-together)

In 2009 Croatia faced complications at the Copenhagen Climate Change Conference due to the adoption of the National Energy Strategy that leads Croatia into more dependence on fossil fuels and an increase of greenhouse gas emissions. Another event that may have affected Croatia is that, after the UN Committee for the Implementation of Kyoto Protocols dismissed the First Initial Report on Croatia’s implementation of the Protocol, having in mind that Croatia artificially added 3.5 million tons of emissions to the real
emissions of 1990, the base year in the UN Framework Convention on Climate Change, it was later approved by the Convention Assembly of 2006.

The 21st session of the Conference of the parties to the United Nations Framework Convention on Climate Change and the 11th session of the parties to the Kyoto Protocol were held in the framework of the Paris Climate Change Conference held in Paris on 30 November-12 December 2015, resulting in the conclusion of the new global agreement on climate change - the Paris Agreement. The Republic of Croatia adopted the Act on the Ratification of the Paris Agreement, with final proposal of the Act, at the 3rd session of the Croatian Parliament convened on 17 March 2017, as of which date the provisions of the Paris Agreement became officially binding for our country. (https://unfccc.int/process-and-meetings/conferences/past-conferences/paris-climate-change-conference-november-2015/paris-climate-change-conference-november-2015)

Furthermore, Croatia demanded to be allowed 6% increase of emissions through 2020, compared to the minimum of 20% reduction in most other states, due to the new Energy Strategy, which includes plans to build two new coal-fuelled power plants, with the possibility to build a nuclear power station (2020 at the earliest) and re-launch the Adria pipeline project. (https://www.mzoip.hr/doc/energy_strategy_of_the_republic_of_croatia.pdf)

Agreements signed by Croatia can be found in the website of the Ministry of Environmental and Nature Protection: http://www.mzoip.hr/hr/propisi-i-medunarodni-ugovorixxx.html. This website mentions all the International treaties ratified or signed by the Republic of Croatia.

Croatia's basic development orientations have been defined in socio-economic development documents and sector strategies and plans. The sector strategies relevant to the environment sector are:

- National Environmental Strategy (2002); (https://narodne-novine.nn.hr/clanci/sluzbeni/2002_04_46_924.html?fbclid=IwAR1G_4GTobCTwoiStEo3xf9Ju81XR3fErm5jKd6icVjk0FS5D4802hX7ciLU)
- Transport Development Strategy of the Republic of Croatia (2017 - 2030); (http://www.kormany.hu/download/9/9f/11000/00_HR_kozlekedesfejlesztesi_strategia_EN.pdf)
- Croatian Tourism Development Strategy for the Period up to 2020 (2013):
Documents that determine the national environmental policy framework in Croatia are:

- **Strategy Government Programmes 2013-2015**
- **The National Environmental Strategy (NES) and National Environmental Action Plan (NEAP)**
- **NES is subsequently supported by sub-sector strategies, such as the National Waste Management Strategy and the draft National Water Management Strategy**
- **Strategy of Sustainable Development of the Republic of Croatia**
- **Waste Management Plan 2017-2022**
- **Water Management Plan (yearly updated)**

The **Strategy of Government Programmes 2018-2022** defined priorities and goals of the Government of the Republic of Croatia with sustainability and environmental protection being part of it.

The **National Environmental Strategy** is the key document for the environmental sector; it demonstrates that environmental pressures come from all economic sectors. However sectors of particular importance are transport (user structure, infrastructure construction, and fuel quality), energy (emissions, transfer, waste and use of fossil fuels), industry (emissions and wastewaters), tourism and partly agriculture (use of artificial fertilizers, pesticides). The environment and its loads and pressures not only affect the quality of life for residents, but equally also the attractiveness of Croatia as a tourist destination and its international perception as a country with a preserved environment and healthy food production.

Therefore, it is of utmost importance that timely and effective solutions to the problems in the environment sector are found; improving the environmental infrastructure can solve the primary problems of waste management and water resources.

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[https://narodne-novine.nn.hr/clanci/sluzbeni/2002_04_46_024.html?fbclid=IwAR1G_4GTozCtewiEe3AfRbV81XR3IEm5k65juVA4FS4802bX7dLJ](https://narodne-novine.nn.hr/clanci/sluzbeni/2002_04_46_024.html?fbclid=IwAR1G_4GTozCtewiEe3AfRbV81XR3IEm5k65juVA4FS4802bX7dLJ)
The NES has the following national long-term environmental objectives:

- Conservation and improvement of water, sea, air and soil quality;
- Conservation of the current state of biological diversity;
- Preservation of natural resources, particularly the integrity and features of special natural assets (sea, coast and islands, mountain areas, etc.).

The main national strategic documents for the waste and water management sectors are the Waste Management Strategy (OG No. 31/11) and the Water Management Strategy (OG. No 91/08). The Waste Management Strategy was adopted in October 2005 and establishes the framework for waste reduction and sustainable waste management. The Water Management Strategy was adopted in July of 2008 and provides the strategic framework for the sustainable use of water resources in the country.

The Clim-Var Project - 'Integration of climate variability and change into national strategies to implement the ICZM Protocol in the Mediterranean' is funded by UNEP/GEF and implemented in 8 Mediterranean countries (Algeria, Albania, Montenegro, Egypt, Croatia, Morocco, Tunisia and Palestine) by UNEP/MAP in Athens, supported by its two Regional Activity Centres, Blue Plan (BP/RAC) in Nice and Priority Actions Program (PAP/RAC) in Split. The project was initiated in January 2012, with completion expected in December 2015. Within the framework of this project Croatia was, along with Tunisia, selected as a pilot area for two activities:

- Cost assessment due to climate variability and change, by using the globally renowned DIVA method (Dynamic Integrated Vulnerability Assessment), and
- Development of the Integrated Coastal Zone Management plan with special focus on climate variability and change. The ICZM Plan focuses on the defined part of the Šibenik-Knin County, and the process is carried out with the help of a participatory method 'Climagine'.


The expected impact of the investments in the environmental sector:

- 10 new waste management centres established and fully operational (2023);
- Share of municipal waste deposited onto or into land reduced from 83% (2012) to 35% (2023);
- Additional waste recycling capacity of 30,000 tonnes per year;
- Additional 1 million inhabitants served by improved water supply and improved waste water treatment (2023);
- 40% of the Natura 2000 management framework in place as a basis for conservation actions according to the obligations in the acquis (2023) (EC environment country report 2017, p21).
The National Waste Management Strategy (2007-2015) assesses the situation, identifies the problems and obstacles and sets the main waste management objectives for the period 2005-2025; these goals include:

- Development of an integrated waste management system
- Establishment of county and regional waste management centres
- Remediation and closure of existing landfills
- Remediation of sites highly polluted by waste – hot spots; and
- Improved information and reporting systems for the waste management system. (https://mzoip.hr/doc/waste_management_plan_og_85-207.pdf)

The Waste Management Strategy regulates the management of different types of waste on the territory of the Republic of Croatia, from its generation to final disposal, with the basic aim of achieving and maintaining an integrated waste management system, which will be organized in line with contemporary European requirements and standards. The purpose of an integrated waste management system is to avoid to the maximum extent, (i.e., reduce) the generation of waste, to minimize the adverse impacts of waste on the environment, climate and human health, and to harmonize the entire waste management system with the principles of sustainable development.

The Waste Management Strategy will be implemented through a National Waste Management Implementation Plan, which was adopted on 19th July 2007 by the Government of the Republic of Croatia and will be valid for a period of 8 years. The Waste Management plan of the Republic of Croatia for the period 2017-2022 is adopted in January 2017.

The relevant county waste management plans, which have been developed or are in the development stage, will elaborate, in accordance with the National Plan, the individual project details and how they fit into the county/regional integrated waste management system.

The National Water Management Strategy is the basis upon which water management reforms are being implemented in order to equalize with EU standards.

- Water management plan is a document adopted once a year on water managing. It has to comply with the financial plan of Croatian Waters and with the Water Areas Management Plan (http://www.voda.hr/hr/plan-upravljanja-vodama-0).
- There are several examples of good practice in environmental implementation and innovative approaches that could serve as examples, including:
  - Eco Island Krk is an ecologically-based system for the management of municipal waste, which represents an integral model of waste disposal, the first of its kind in Croatia. In 2015, the
municipality achieved 50% of its waste separation and preparations for re-use and recycling, thereby already meeting the 2020 target set in the Waste Framework Directive.

- An EU-funded project on the modernisation of the water and waste-water infrastructure has been finalised in Slavonski Brod. Its main objective was to ensure that it meets European standards, bringing benefits to inhabitants and safeguarding the environment in the River Danube basin.

- In October 2015, Croatia prepared the Green Book: the technical basis for the development of a low-carbon strategy for Croatia for the period until 2030, and looking ahead to 2050. This strategy sets out the path towards a competitive low-carbon economy. It applies to all sectors of the economy and human activities, but is related in particular to energy, industry, transport, agriculture, forestry and waste management (http://ec.europa.eu/environment/eir/pdf/factsheet_hr_en.pdf).

### 3.3 INSTITUTIONAL FRAMEWORK

On a general level, responsibility for environmental policy lies mainly within the following three ministries:

- The **Ministry of Environmental and Nature Protection** (www.mzoip.hr)
- The **Ministry of Agriculture** (http://www.mps.hr/default.aspx?id=5340)
- The **Ministry of Regional development and EU funds** (www.mrrfeu.hr)


In addition, the Croatian Agency for the Protection of Environment and Nature (merger of the Agency for Environment Protection http://www.haop.hr and the State Institute for Nature Protection http://www.dzzp.hr/eng/) has the task of gathering and providing environmental data. Last but not least, there are the Environmental Protection and Energy Efficiency Fund and the Croatian Waters for water management.

Moreover, the Association of Municipal Waste Management at the Croatian Chamber of Economy gathers all the companies within the same domain and implements activities like seminars, education, determines remarks and suggestions related to legal framework, organizes fairs and similar events.

(http://www.hgk.hr/category/udruzenja/udruzenje-komunalnog-gospodarstva).
WASTE MANAGEMENT IN CROATIA
Waste and water management in Croatia

4. WATER MANAGEMENT IN CROATIA - OVERVIEW

Waste is an unavoidable by-product of most human activity. Economic development and rising living standards have led to increase the quantity and complexity of generated waste.

A clear estimation of the quantities and characteristics of the generated waste is a key component in the development of robust and cost-effective waste management.

Waste is divided according to its attributes and according to the place of origin. Classification by attributes envelopes: hazardous waste, non-hazardous waste and inert waste. According to the place of origin the waste is divided into: municipal solid waste, industrial waste, biomedical waste, agriculture waste, mining waste and special categories of waste.

Hazardous waste: With rapid development in agriculture, industry, commerce, hospital and health-care facilities are consuming significant quantities of toxic chemicals and producing a large amount of hazardous waste. Hazardous waste contains elements with attributes that are explosive, radioactive, harmful, toxic, cancerogenic, reactive, corrosive, contains teratogen, ecotoxic and elements that have the property of emitting toxic gases as a result from chemical reactions or biodegradation.

Non-hazardous waste is waste that by its properties does not affect human health and environment in any aspect.

Inert waste is a type of waste that either does not contain or contains a small amount of elements that have the property of physical, chemical and biological degradation. This type of waste is not harmful to the environment.

Municipal Waste: Municipal solid waste (MSW) is generated from households, offices, schools and other institutions. The major components are food waste, paper, plastic, and rags, metal and glass, although demolition and construction debris is often included in collected waste, such as electric light bulbs, batteries, automotive parts and discarded medicines and chemicals. Sources and types of solid wastes:
### Table 2: Sources and types of solid wastes

<table>
<thead>
<tr>
<th>Source</th>
<th>Typical waste generators</th>
<th>Types of solid wastes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>Single and multifamily</td>
<td>Food wastes, paper, cardboard, plastics, textiles, leather, yard wastes, wood, glass, metals, ashes, special wastes (e.g. bulky items, consumer electronics, white goods, batteries, oil, tires), and household hazardous wastes</td>
</tr>
<tr>
<td>Industrial</td>
<td>Light and heavy manufacturing, fabrication, construction sites, power and chemical plants</td>
<td>Housekeeping wastes, packaging, food wastes, construction and demolition materials, hazardous wastes, ashes, special wastes</td>
</tr>
<tr>
<td>Commercial</td>
<td>Stores, hotels, restaurants, markets, office buildings, etc.</td>
<td>Paper, cardboard, plastics, wood, food wastes, glass, metals, special wastes, hazardous wastes</td>
</tr>
<tr>
<td>Institutional</td>
<td>Schools, hospitals, prisons, government centres</td>
<td>Same as commercial</td>
</tr>
<tr>
<td>Construction and Demolition</td>
<td>New construction sites, road repair, renovation sites, demolition of buildings</td>
<td>Wood, steel, concrete, dirt, etc.</td>
</tr>
<tr>
<td>Municipal Services</td>
<td>Street cleaning, landscaping, parks, beaches, other recreational areas, water and wastewater treatment plants</td>
<td>Street sweepings, landscape and tree trimmings, general wastes from parks, beaches, and other recreational area, sludge</td>
</tr>
<tr>
<td>Process</td>
<td>Heavy and light manufacturing, refineries, chemical plants, power plants, mineral extraction and processing</td>
<td>Industrial process wastes, scrap materials, off specification products, slag, tailings</td>
</tr>
</tbody>
</table>

All of the above should be included as "municipal solid waste.”

| Agriculture             | Crops, orchards, vineyards, dairies, feedlots, farms | Spoiled food wastes, agricultural wastes, hazardous wastes (e.g. pesticides) |

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Waste and water management in Croatia
Industrial solid waste encompasses a wide range of materials of varying environmental toxicity. Typically this range would include paper, packing materials, waste from food processing, oils, solvents, resins, paints and sludge, glass, ceramics, stones, metals, plastics, rubber, leather, wood, cloth straw, abrasives, etc.

Regulations related to industrial waste:
- Ordinance on packaging and packaging waste (OG No. 97/05, 115/05, 81/08, 31/09, 156/09, 38/10, 10/11, 81/11, 126/11, 38/13, 86/13)
- Decision on requirements regarding packaging labelling (OG No. 155/05, 24/06, 28/06)
- Ordinance on waste tyre management (OG No. 113/16)
- Ordinance on waste oil management (OG No. 124/06, 121/08, 31/09, 156/09, 91/11, 45/12, 86/13)

Biomedical waste includes infectious waste from hospitals and waste from medical and laboratory origin.
- Ordinance on medical waste management (OG No. 50/15).

Agricultural Waste and Residues: Expanding agricultural production has naturally resulted in increased quantities of livestock waste, agricultural crop residues and agro-industrial by-products.
- Ordinance on management of wastewater treatment sludge when used in agriculture (OG No. 38/08).

Construction waste is the waste that originates from constructing buildings, reconstructing, and removing and maintaining of existing buildings.
- Ordinance on the method and procedures for managing waste containing asbestos (OG No. 69/16)

Mining waste is the waste from extraction and processing of mineral resources.
- Ordinance on managing waste from research and mining of mineral raw materials (OG No. 128/08)

Special categories of waste encompass radioactive and explosive waste.

International treaty


Published in OG–IT No. 3/94, came into force with respect to the Republic of Croatia on 7 August 1994.

Waste management responsibilities in Croatia are divided between the following institutions:

**The Croatian parliament** and **the Government of the Republic of Croatia** are State Authority Bodies. The Parliament adopts the relevant legislation and national strategies, such as the Waste Management Strategy.
A Parliamentary committee issues opinions on specific acts and documents. The Government adopts the waste management plan and its implementing legislation (Regulations), proposes relevant legislation and strategies to Parliament and defines mandatory locations. The Government ensures the conditions and prescribes the measures for hazardous waste management and for the incineration of waste.

The Ministry of Environmental and Nature Protection (www.mzoip.hr) is a State Administration Body (ministries, State Administration offices in the counties). In the waste sector, it is responsible for:

- Preparing new primary legislation and standards;
- Preparing the National Waste Management Strategy and National Waste Management Implementation Plan;
- Preparing implementing legislation;
- Approving reports on the state of the environment and the environmental protection programs;
- Approving activities (interventions) based on environmental impact assessments;
- Issuing permits for hazardous waste management and the incineration of waste; and concessions for specific waste category management (used tyres, packaging waste, waste oils etc.);
- Hazardous waste management (implementation of measures);
- Inspection and supervision and enforcement of laws and secondary legislation;
- Monitoring the Croatian Environment Agency and Environmental Protection and Energy Efficiency Fund.

The Environmental Protection and Energy Efficiency Fund (EPEEF, http://fzoeu.hr/en/), established in 2003 and operating since the beginning of 2004, is an extra-budgetary institution owned by the Republic of Croatia, the purpose of which is to finance environmental protection programmes and projects.

This also includes energy efficiency and use of renewable energy sources. The EPEEF collects different environmental charges as its own revenue, which includes charges for burdening the environment with hazardous and non-hazardous industrial waste.

4.1 WASTE MANAGEMENT IN CROATIA

In Croatia, waste management is currently one of the largest challenges in the environmental sector and certainly one of the most demanding areas in terms of adjustment to the standards of the European Union (EU). Solving these issues and orientation toward integral and modern waste management are one the requirements for EU entry. The issues that the country needs to address are: increase in solid waste, limited recycling programs, unreliable data concerning flows and quantities and lack of organized disposal sites and management issues.
The Ministry of Environmental and Natural Protection ([http://www.mzoip.hr/en/](http://www.mzoip.hr/en/)) is the State Administration Body. The main goal of the Ministry in this area is to protect the environment and human health through responsible management of waste.

The country is expecting that in 2025 almost the entire population will be included in the organized collection of a municipal waste system, recycled and treated waste will grow significantly, and an important reduction of disposed municipal and biodegradable waste will be achieved.

Currently municipal waste management in Croatia is undergoing a radical transformation from decentralized disposal of non-treated waste on numerous local sub-standard landfills within counties to centralized waste management and Waste Management Centres (WMC) serving the needs of one county or, in some cases, of several counties. The WMC concept has been adopted by the Croatian Government in its National Waste Management Plan. During the 2017 a total of 130 waste landfills were active.


### 4.2 CROATIA’S WASTE STATISTICS AND WASTE MANAGEMENT PRACTICES

#### 4.2.1 Statistics

**Waste management**

During the year 2017 a total of 130 landfills were active. The total decommissioned amount of all types of waste to 130 active landfills in 2017 amounts to 1,814,539.39 tons, which is 3.09% less than in 2016. The total amount of landfilled biodegradable municipal waste reported in 2017 is 801,238.12 tons. New data from 2017.  


[http://www.haop.hr/hr/tematska-podrucja/otpad-i-registri-oneciscavanja/gospodarenje-otpadom/izvjesca/poslovi-nositelja](http://www.haop.hr/hr/tematska-podrucja/otpad-i-registri-oneciscavanja/gospodarenje-otpadom/izvjesca/poslovi-nositelja)

In 2014 the total reported quantities of produced waste (municipal and production waste) were around 3.7 million tonnes which is a 10.5% increase compared to 2012. Of the total amount of waste, non-hazardous waste constitutes 97%, while hazardous waste constitutes the remaining 3%.

Regarding the origin of the waste, the largest portion is household waste (31%), which includes different types of waste produced by citizens, from municipal waste to other types of waste like, for example, end-of-life vehicles. As regards business and industry activities, the biggest producers of waste are the service sector and the construction sector, each with a portion of 17%. After that comes the processing industry with a portion of 12% and waste collection, treatment, disposal and recovery activities with a portion of 11%.
The remaining business activities comprise 12% of the total quantities of produced waste, but it is important to note that the data on reported quantities of waste from certain sectors are still of insufficient quality (construction, agriculture etc.) In addition, a part of the remains, e.g. from agriculture, forestry or from extraction of mineral resources is not considered waste and hence is not reported.

Together with certain kinds of municipal waste (e.g. mixed municipal waste), in the total quantities of produced waste, the most numerous types are waste metals (13%), soil (9%), mineral construction waste (9%), animal faeces, urine and manure (7%) and waste paper (6%).

According to reported data from recovery or waste disposal entities, in 2014, a total of around 3.4 million tonnes of waste has been treated (production and municipal waste), of which 3.1 million is waste from within Croatia, while 315,000 tonnes are imported waste. The data pertain to “finishing operations”, after which no further waste treatment takes place. The remaining quantities of produced waste are subjected to pre-treatment procedures, i.e preparation for finishing operations or exported to be processed outside of the Republic of Croatia.

56% of total processed waste (production and municipal) collected was landfilled, while 44% was recovered. In comparison to 2012, a 10% decrease in waste disposal procedures was noted, as well as an 8% increase in recovery.

In recovery (44%), the biggest part is material recovery (40%), while a very small fraction refers to energy recovery (2%) and procedures such as using construction and demolition waste at landfills for technical purposes in landscaping or as cover material (2%). The portion of waste processed via incineration without energy recovery is negligible, and constitutes a mere 0.002% (MZOIP 2017). [https://narodne-novine.nn.hr/clanci/sluzbeni/2017_01_3_120.html](https://narodne-novine.nn.hr/clanci/sluzbeni/2017_01_3_120.html)

### 4.2.2 Waste Management Practices in Croatia

In Croatia, the most used waste practices are:

**Recycling** is the process of extracting resources or value from waste is generally referred to as recycling, meaning to recover or re-use the material. There are many ways to recycle waste materials: the raw materials may be extracted and reprocessed, or the calorific content of the waste may be converted to electricity. This is widely used in Croatia, but there is still a need to upgrade the facilities and implement new technologies in order to increase the efficiency of this method, because the production of energy could be bigger and cleaner.

**Physical Reprocessing** refers to the widespread collection and re-use of everyday waste materials e.g. empty beverage containers. These are collected and sorted in common types, so that the raw materials from which the items are made can be reprocessed into new products.
Materials for recycling may be collected separately from general waste using designated waste bins and collection vehicles, or sorted directly from mixed waste streams.

The most common consumer products recycled include aluminium beverage cans, steel food and aerosol cans, HDPE and PET bottles, glass, and jars, paperboard cartons, newspapers, magazines, and cardboard. Other types of plastic (PVC, LDPE, PP and PS) are also recyclable, although these are commonly collected.

These items are usually composed of a single type of materials, making them relatively easy to recycle into new products. The recycling of complex products (such as computers and electronic equipment) is more difficult, due to the additional dismantling and separation required.

Croatia still has a long way to increase the amount of recycled material. There are containers in order to recycle this kind of products but there are not used properly. Although there is no lack of this kind of bins, in general the population does not have yet the proper services in order to recycle the material after it is collected.

**Composting**: Waste materials that are organic in nature, such as plant material, food scraps, and paper products, can be recycled by using biological composting and digestion processes to decompose the organic matter. The resulting organic material is then recycled as much as possible or composted for agricultural or landscaping purposes. In addition, waste gas from the process (such as methane) can be captured and used for generating electricity. In order to prevent landfilling bio-waste at landfills and contribute to the achievement of other waste management goals, it is necessary to promote composting among the general population.

The goal is that the households separate bio-waste from other household (municipal) waste by putting them in bio-waste containers, and by composting in personal composters or their garden, decrease the total quantities of produced waste. This measure will encompass rural areas, i.e. suburbia to urban centres with a larger number of households with yards. In the Republic of Croatia, the implementation of this measure could deduct 90,000 t of bio-waste annually (MZOIP 2017).

**Energy Recovery**: The energy content of waste products can be harnessed directly by using them as a direct combustion fuel, or indirectly by processing them into another type of fuel.

**Incineration**: Incineration is a disposal method that involves combustion of waste material. Incineration and other high temperature waste treatment systems are sometimes described as "thermal treatment". Incinerators convert waste materials into heat, gas, steam, and ash.

Incineration is carried out both on a small scale by individuals and on a large scale by industry. It is used to dispose of solid, liquid and gaseous waste. It is recognized as a practical method of disposing of certain hazardous waste materials (such as biological medical waste). Incineration is a controversial method of waste disposal, due to issues such as emission of gaseous pollutants.
**Landfill**: Disposing of waste in a landfill involves burying the waste, and this remains a common practice in most countries. A properly-designed and well-managed landfill can be a hygienic and relatively inexpensive method of disposing of waste materials.


Another category of waste is bulky waste. Its regulations on the disposal are prescribed in the Law on sustainable waste management [http://narodne-novine.nn.hr/clanci/sluzbeni/2013_07_94_2123.html](http://narodne-novine.nn.hr/clanci/sluzbeni/2013_07_94_2123.html).

Here are data about special waste categories:

- Waste from old batteries and accumulators 320.91 t
- Electronical waste 38.815.390 t
- Waste grease 7.814.761 l
- Waste edible oils 916.184.770 l
- Waste tyres 19.051.63 t

### 4.2.3 Hazardous waste management report

**Market Demand**

Taking care for hazardous waste is still in progress in Croatia. The organization of separate collection and technical capacities for the collection, storage and treatment of certain types of hazardous waste is already in progress.

Aspects still to be completed for these projects include organizing the network of collection points for hazardous waste; establishing a system of hazardous waste collection and transportation; establishing centres for hazardous waste management (recycling, treatment, disposal); erecting an incinerator; development of a special information system with databases and waste flows; and the development of a network of regional storage facilities for sorting and storing hazardous organic and inorganic waste.

Hazardous waste management is the responsibility of the Ministry of Environmental Protection, Physical Planning and Construction (MEPPPC); industrial non-hazardous waste is the responsibility of 21 counties (including the City of Zagreb).

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1 [http://www.haop.hr/hr/tematska-podrujca/otpad-i-registri-oneciscavanja/gospodarenje-otpadom/izvjesca](http://www.haop.hr/hr/tematska-podrujca/otpad-i-registri-oneciscavanja/gospodarenje-otpadom/izvjesca)
Hazardous Waste Incinerator

The problem of hazardous waste incineration in Croatia has been discussed approximately for the last 20 years. It is hard to achieve any kind of agreement because of the dissents of inhabitants of potential incinerator places and legal authorities.

The problem of hazardous waste in Croatia was solved by "wild" landfills or by export. The first one left severe consequences on the environment which is now really expensive to re-establish and it takes a lot of time. The second one is very expensive to perform.

Rehabilitation of "hot spots"

The Waste Management Strategy of the Republic of Croatia (OG 130/05-https://mzoip.hr/doc/waste_management_strategy_op_130-205.pdf) defines "hot spots" as highly polluted locations in the environment, due to a long-term, unsuitable management of production (technological) waste (e.g. waste from leather and textile industry, waste from production and processing, drill-in fluids, oily soil and sludge left around deep wells, container sediments, waste from inorganic technological processes - acids, bases, heavy metal salts, waste from the artificial fertilizer production, waste from organic chemical processes, waste from paint remains and aerosol paints, pesticides, photographic industry waste, waste from inorganic thermal processes, waste oils of mineral origin and waste organic solvents, tyres, vehicles and asbestos production waste, as well as batteries and lead accumulators).

By the end of 2016, the following sites have been remedied: the Bakar Coke Plant (2010), asbestos cement waste around the bankrupted Salonit d.d. plant in Mravinačka kava (2007), the dig site on top of which the football field "Omladinac" in Vranjic is situated (2009), Mravinačka kava (2012), hazardous waste landfill, Lemić brdo near Karlovac (2016) and the landfill of slags from Plomin I Thermal Power Plant.

The remediation of the phosphorus gypsum landfill in Kutina is planned together with a complete landfill remediation and closing project financed by the owner.

Besides "hot spots", the Waste Management Plan of the Republic of Croatia for the period from 2007 to 2014 defines locations polluted by hazardous waste. By the end of September 2016, the following locations have been remedied: the polluted grounds of the former electrodes and ferroalloys plant in Šibenik (2015), the closed-down factory 'Borovo' in Vukovar - phase I (2009) and tar remediation on the beach Salbunara in the City of Komiža - Biševo island (2008).
Table 3 Measures for remediation of polluted locations

5. MAJOR ISSUES IN WASTE MANAGEMENT PRACTICES IN CROATIA

Croatia entered the EU so it has to adjust to EU laws. It is hard to do that after many years of letting ‘wild landfills’ to happen. Not only is the environment destroyed but it will take years for it to recover. Not to mention that at the end it costs a lot of time and money. Here are the major issues and problems in the waste management in Croatia are:

- Increased volumes of waste being sent to landfill;
Limited waste separation at the point of generation, along with low recovery and treatment rates;
- Shortage of municipal waste recovery and treatment plants
- Underdeveloped information and reporting systems

6. GOALS AND PRIORITIES

The legislative-regulatory framework for waste management seeks to establish a higher-quality waste management system based on waste prevention and an efficient system of separate collection of waste which is adequately recovered.

Waste prevention contributes to the accomplishment of the following general goals in waste management:

- separating economic growth from the increase of waste quantities;
- guarding natural resources;
- decreasing the total mass of landfilled waste;
- decreasing the emissions of polluting matters in the environment;
- decreasing the hazard for human health and the environment (MZOIP 2017).

7. LEGAL FRAMEWORK

Croatian legislation related to waste and water sector:
- The Environmental Protection Act (OG 80/13, 153/13, 78/15, 12/18);
- Act on Sustainable Waste Management (OG No. 94/13, 73/17);
- The Water Act (OG No. 107/95 and 150/05);
- The Water Management Financing Act (OG No. 107/95, 19/96, 88/98 and 150/05).

On 23rd of July 2013, Croatian Parliament declared the law on sustainable waste management (OG No. 94/13).

- Avoiding and reducing the generation of waste and reducing the hazardous properties of waste;
- Waste recovery (recycling, reuse or through some other procedure that allows separating the raw materials, or use of waste for energy purposes);
- Waste disposal in the prescribed manner; and
Remediation of the environment polluted by waste.

The relevant provisions of Council Directive 75/442/EEC on waste, as amended by the Council Directive 91/156/EEC, Commission Decision 94/3/EC, Commission Decision 96/350/EC and Commission Decision 2000/532/EC have been transposed into the Waste Act. This Act also sets out the general legal framework for further approximation with EU legislation in the waste sector, which includes some secondary legislation that has already been adopted:

 ✓ Regulation on types, categories and classification of waste with a waste catalogue and hazardous waste list (OG No. 50/05)
 ✓ Ordinance on packaging and packaging waste (OG No. 97/05 and 115/07),
 ✓ Decision on conditions for packages labelling (OG No. 155/05, 24/06 and 28/06)
 ✓ Ordinance on waste tyres management (OG No. 40/2006)
 ✓ Ordinance on register of legal and natural person performing activities of intermediation in organizing recovery and/or disposal of waste and legal and natural persons which export non-hazardous waste (OG No. 51/06)
 ✓ Ordinance on the criteria, procedure and manner of determining compensation to real estate owners and local self-government units (OG No. 59/2006)
 ✓ Regulation on control of shipments of waste (OG No. 69/06 and 17/07)
 ✓ Ordinance on waste oil management (OG No. 124/06)
 ✓ Ordinance on waste batteries and accumulators management (OG No. 133/06)
 ✓ Ordinance on end-of-life vehicles management (OG No. 136/06)
 ✓ Ordinance on waste management (OG No. 23/07)
 ✓ Ordinance on the manner and procedures for the management of waste containing asbestos (OG No. 42/07)
 ✓ Ordinance on the manner and requirements for thermal processing of waste (OG No. 45/07)
 ✓ Ordinance on medical waste management (OG No. 72/07)
 ✓ Ordinance on waste electrical and electronic equipment management (OG No. 74/07)
 ✓ Ordinance on waste oil management (OG No. 124/06)
In addition, certain waste management aspects are regulated by other sectorial legislation and international agreements:

- Environmental Protection Act (OG No. 82/94 and 128/99)
- Act on Public Utilities (OG No. 26/03, 178/04)
- Air Protection Act (OG No. 178/04)
- Regulation on Limit Values of Emission Pollutants from Stationary Sources into the Air (OG No. 21/2007)
- Act on Environmental Protection and Energy Efficiency Fund (OG No. 107/03)
- Physical Planning Act (OG No. 30/94, 68/98, 35/99, 61/00, 32/02 and 100/04)
- Maritime Act (OG No. 181/04)
- Maritime Domain and Ports Act (OG No. 158/03 and 141/06)
- Act on Ratification of United Nations Framework Convention on Climate Change (OG - International Treaties No. 2/96)
- Kyoto Protocol to the United Nations Framework Convention on Climate Change (OG - International Treaties No. 5/07)
- Montreal Protocol on Substances that Deplete the Ozone Layer (OG – International Treaties No. 12/1993)
- International Convention MAR POL 73/78, i.e. Protocol V which regulates waste disposal in ports


Foundations are formed on the:

- Waste Act (https://mzoip.hr/doc/act_on_sustainable_waste_management.pdf)
- Environmental Protection Act (http://www.mvep.hr/zakoni/pdf/339.pdf)
- Air Protection Act (OG No. 130/11, 47/14, 61/17)
- Law on Environmental Protection and Energy Efficiency Fund
- Law on Physical Planning, Law on Utility Services, Maritime Law
- Law on Maritime Domain and Ports
- Ratification of Basel Convention
- Kyoto Protocol on Climate Change, Montreal Protocol
- Stockholm Convention
- International Convention MAR POL 73/78, i.e. the Protocol V regulating waste disposal in ports
- Barcelona convention
- Waste Management Strategy of the Republic of Croatia (OG No. 130/05) http://narodne-novine.nn.hr/clanci/sluzbeni/289920.html
- Waste Management Plan of the Republic of Croatia for 2017-2022
8. **WASTE PROJECTS**

8.1 **CROATIA NATIONAL STRATEGY FOR SOLID WASTE**

The project aims to build broad consensus among key stakeholders about the best policy mix for Croatian municipalities to achieve compliance with the EU waste framework requirements. The strategy served as a basis for Waste management plan.

**WASTE MANAGEMENT IN CROATIA – PLANS AND OBLIGATIONS IN NEAR FUTURE**

**Opportunities**

The LIFE programme is the EU’s funding instrument for the environment and climate action. The general objective of LIFE is to contribute to the implementation, updating and development of EU environmental and climate policy and legislation by co-financing projects with European added value. Since 1992, more than 4000 projects have been co-financed through LIFE programme, and for the period from 2014 to 2020, 26 billion Croatian Kuna was secured. By 2017, Croatia got the opportunity to use 155 million Kuna from the fund for the projects related to environment and climate protection [link](http://www.mzoip.hr/hr/ministarstvo/vijesti/hrvatskoj-do-2017-za-projekte-zastite-okolisa-i-klim-e-kroz-life-program-na-raspolaganju-oko-155-milijuna-kuna.html).
9. WATER MANAGEMENT IN CROATIA

Water receives special attention in Croatia. According to Croatian Water (Hrvatske vode – www.voda.hr), water management ‘is the total of deliberate and organized activities of different people aimed at the preservation, rational use and control of water, essential for survival on the earth’. It also consists of a group of activities, decisions and measures meant for the purpose of maintenance, improvement and establishing of the integrity of the water regime in a given area, which is achieved in particular by providing the required quantities of water of adequate quality for various purposes, by protection of water against pollution, regulation of watercourses and other water bodies, and by protection from adverse effects of water.

The term ‘water management’ denotes the execution and the organization of the execution of tasks related to the provision of required water quantities, protection of water from pollution, the regulation of watercourses and other water bodies, and the protection from adverse effects of water, not including the tasks carried out by government bodies and local self-government and government units.

The basic source for water use in Croatia is surface water, followed by groundwater and marginal quantities of desalinized water.

9.1 INTRODUCTION OF FRESH WATER RESOURCES IN CROATIA

Croatia belongs to a group of countries for which water issues are not a limiting factor of development.

The amount of water per inhabitant places the Republic of Croatia among the best endowed countries in Europe. The average volume of the country’s own and transit waters is 25,160 m³/cap/year of which the own waters account for 5,880 m³/cap/year. The total length of all natural and artificial watercourses in the area of Croatia is 21,000 km.

The river Danube, the largest and richest in water, flows through the eastern borderland of Croatia over a length of 137.5 km. Other major rivers are the Sava (562 km) and the Drava (505 km). The rivers of the Adriatic catchment area are short, have rapids and canyons.

There are not many lakes in Croatia. The artificial storage lakes with a total volume of 1,050 million m³ have been created as a part of hydropower plants. They are Dubrava Lake (17.1 km²) on the river Drava and Peručko Lake (13 km²) on the river Cetina.

The presence of karst causes that the parts of the border between Slovenia and Croatia, and that between Bosnia-Herzegovina and Croatia have numerous underground connections and stream flows which are hard to determine. This makes the management of the border and transboundary water resources shared with the neighbouring countries very difficult.
Approximately 40% of the Croatian territory is covered with limestone-dolomite rocks, in which deep karstic underground forms prevail.

In spite of extensive research activity, the knowledge on the amount and the condition of underground water is inconclusive. Alluvial, karstic, artesian and other aquifers are not sufficiently explored. It can be concluded that Croatia is a country rich in water, especially considering the low population density and modest demand for industrial and agricultural water, which is well below average of developed countries. The relatively high quality of both surface and ground water can certainly be considered a positive element, with most problems occurring during warm summer periods when the natural discharge is small, the groundwater level low and water demand increased due to tourism and irrigation demands. The potable water supply consists of 86% groundwater and 14% surface water.

Central sewer systems are constructed only in large urban and industrial centres. Less than 35% of wastewater in Croatia is discharged into the sewer systems and less than 10% is treated in wastewater treatment plants.

9.2 WATER MANAGEMENT PRINCIPLES

Water management [www.voda.hr](http://www.voda.hr)
[www.mps.hr](http://www.mps.hr) (Ministry of Agriculture)

In the water sector the data used in the EPOP relies on several data sources: the National Water Management Strategy (2007-2015), MAFWM (Ministry of Agriculture, Forestry and Water Management), Croatian Water, the Croatian Central Bureau of Statistics (Statistical Yearbooks) and EUROSTAT. The data collection system in the water sub-sector in Croatia has also to be improved on the basis of the existing legal framework.

The environment sector and environmental policy correspond to the national level, rather than regions, and the data provided in the EPOP refers to the national level (NUTS I).

For water management purposes, Croatia’s territory is divided into 4 water basins and 34 catchment areas. The water basin comprises one or more catchment areas of major river watercourses, or parts thereof, constituting a natural hydrographical entity. The catchment area comprises, within a water basin, one or more catchments of minor watercourses for which integrated water management is provided. With respect to interconnected problems, existing water system and economic conditions.

9.3 WATER USE

Water use implies the following:

- Abstraction, pumping and use of surface water and groundwater for various purposes (drinking water supply, sanitary and technological purposes, irrigation, etc.).
- Use of water power for production of electricity and other similar purposes.
– Use of water for fish-farming.
– Use of water for navigation,
– Use of water for sports, bathing, recreation and other similar purposes.

**Water Supply**

The use of water for the supply of the population with drinking water, sanitary purposes, fire protection and defence has absolute priority over water use for other purposes.

The water supply activity consists of abstraction and pumping of groundwater and surface water for drinking and other purposes, treatment of water to the level of health standard, transport to the place of consumption, and distribution to consumers.

The quality of water for water supply must comply with the conditions defined by the Regulation on Water Classification and other conditions prescribed by the law or bye-laws.

**Use of water for ameliorative irrigation**

Abstraction and use of water from watercourses and other surface water bodies, pumping of groundwater and collecting rainwater for irrigation of agricultural and other land (ameliorative irrigation) is carried out in the manner and under the conditions defined by a water rights permit and a concession contract.

For the purpose of construction and use of ameliorative irrigation systems of interest to several landowners or land users, co-ops may be established.

The professional supervision of these issues is performed by *Hrvatske Vode* (www.voda.hr).

**Use of water power**

The right to use water power for production of electricity and for devices driven by water power is awarded on the basis of a concession contract and a water rights permit.

The basic principle in making the decision on awarding the right to use water power is the principle of greater public interest (improvement of the general standard of living, environmental protection, health protection, etc.), and a more rational use of water power.

Water structures and plants for the use of water power may be designed and constructed to comply with the following requirements:

– They shall allow returning of water into the watercourse or other water body;
– They shall not reduce the existing extent of water use for water supply, irrigation and other purposes, and they shall not obstruct water use for other purposes defined by plans;
– They shall not reduce the level of protection from adverse effects of water, nor impede implementation of such protection measures;
They shall not deteriorate the health conditions nor affect adversely the condition of the environment;

They shall not cause damage to forests and other flora and fauna, nor to property and legal interests of other persons;

They shall not impede pedestrian, road and railway traffic, or inland navigation.

If storage reservoirs for water power use are constructed, it is imperative to ensure their multipurpose character, in particular regarding protection from floods and other adverse effects of water and provision of water for water supply, irrigation and other purposes.

**Wastewater Treatment Systems & Sewage Systems used in Croatia**

**Wastewater treatment systems used in Croatia**

- Mechanical
- Biological
- Membrane
- Plant Lagoon

**Sewage systems**

- Mixed
- Separate

The typical sewage system is mixed (faecal and precipitation waters together). Only a few smaller cities and residential districts of bigger towns have separate or split sewage systems (faecal and precipitation waters are split)

### 10. LEGAL FRAMEWORK

The legal foundations of water management in Croatia are defined by the Constitution of the Republic of Croatia, the Water Act, the Water Management Financing Act and their bylaws, with individual provisions related to water found also in several other laws which regulate other legal areas. The Constitution of the Republic of Croatia defines water a resource of particular interest for the Republic of Croatia and guarantees it special protection.

The primary legislation for **water management** consists of two acts:

- The Water Act, (OG No 153/09., 63/11., 130/11., 56/13. i 14/14.); and
The Water Act regulates and defines the legal status of water and water estate, the preconditions for their use and protection, and the activities and organization of water management. The Water Management Financing Act defines water management revenues, the most significant of which are water charges.

In addition to these two acts, representing the fundamental legal framework, water management in the Republic of Croatia is regulated by approximately 40 subordinate acts. The existing legal framework for water management needs to be harmonized with the EU Acquis:

Relevant for this EPOP are:

- Regulations on special requirements to be met by legal persons carrying out waste water activities
- Regulations on special requirements for carrying out water supply activities
- Regulations on the sanitary quality of drinking water
- National water protection plan
- Regulations on the issuance of water rights acts
- Regulations on the development of the water management master plan of the Republic of Croatia
- Regulations on the establishment of sanitary water source protection zones
- Regulation on water classification
- Regulations on limit values of indices, hazardous and other substances in waste water
- Decision on determining catchments areas
- Decision on the register of national waters
- Decision on determining the boundaries of river basins
- Regulation on hazardous substances in water
- Ordinance on water-related documentation

Croatia has signed and ratified a number of international water management treaties, these include:

- The Convention on the Protection and Use of Trans-boundary Waters and International Lakes (OG – International Treaties No. 4/96);
- The Framework Agreement on the Sava Catchment Area (OG – International Treaties No. 14/03).

There are also important bilateral agreements on water management co-operation signed with the Republic of Hungary, the Republic of Slovenia and the Republic of Bosnia and Herzegovina.
11. INSTITUTIONAL FRAMEWORK

Water management responsibilities in Croatia are divided between the following institutions:

The water management activities in Croatia are divided into: legal (competence of the Croatian Parliament and the Government of the Republic of Croatia), administrative (competence of the Ministry of Agriculture [http://www.mps.hr], Ministry of Environment and Energy [www.mzoip.hr] and other units of State and local and regional authorities), and operative water management activities (competence of Croatian Waters [www.voda.hr]).

The Croatian parliament [www.sabor.hr] and the Government of the Republic of Croatia [www.vlada.gov.hr] are State Authority Bodies. The Parliament adopts the relevant legislation and national strategies, such as the Water Management Strategy. A Parliamentary committee issues opinions on specific acts and documents. The Government adopts the river basin district management plans and proposes relevant legislation and strategies to Parliament.

Ministry of Environment and Energy [www.mzoip.hr]

The focus of the work carried out by the Ministry of Environment and Energy is to create conditions for sustainable development – development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

The scope of work of the Ministry includes tasks related to protection and conservation of the environment and nature in line with the sustainable development policy of the Republic of Croatia, as well as tasks related to water management and administrative and other tasks from the field of energy.

Hrvatske Vode / Croatian Waters [www.voda.hr] is the legal entity for water management in Croatia.

Hrvatske Vode / Croatian Waters are a public institution founded by the Republic of Croatia. It is run by a Management Board and a general manager, both appointed by the Government of the Republic of Croatia.

As distinguished from budgetary funding, Hrvatske Vode / Croatian Water provide direct expert, technical, economic, and legal assistance to municipal users in defining, preparing, and implementing projects of varying complexity. Hrvatske Vode / Croatian Water spends allocated funds on the basis of water management plans.

Hrvatske Vode / Croatian Waters perform water management activities as a public service and is part of the third level of public administration. The first level is the Government of the Republic of Croatia. The second level consists of ministries and state administration organizations. The third level consists of public institutions, public-right organizations, and companies which perform public service and whose major shareholders are the state, counties, towns/cities or municipalities.
Activities related to regulation, inspection and appeal in the field of water management are conducted by the Ministry of Agriculture, Forestry and Water Management, positioned on the second level of the public administration. A special role in water management rests with the National Water Council, a body appointed by Croatian Parliament. It discusses legislation, financing system, the Water Management Master Plan, and the needs arising in various areas of life in connection with the water system.

The tasks performed by Croatian Waters are as follows:

- co-ordination of preparation and development of water supply plans
- co-ordination of preparation and development of water research projects related to individual projects / subprojects
- participation in the preparation of mid-term and long-term planning documentation of the water management
- coordination of implementation of water use plans; monitoring the implementation of water use plans and reporting on execution
- care about setting up a water financing program framework with large co-financiers (ministries, state administrative organizations, companies and state-owned institutions)
- implementation of part of the water supply program (regional water supply systems, supply of water supply), and part of the program of waterworks
- the organization of a system for issuing water rights certificates in the field of water use
- participation in the drafting of legal and sub-legal acts for water use
- conducting statistical data on water consumption from public water supply systems, water prices, losses in the water supply network, collection of water use fees, collection of basic data on financial operations of utility companies in the water supply sector
- elaboration of other expert reports on the state and problems of water use for the needs of the Government of the Republic of Croatia, the Ministry, Croatian waters and others.
- care about developing methodology and organizing the construction of a cadastre of water use
- preparation of previous opinions on decisions on sanitary protection sources
- tracking the development of drinking water purification technology
- professional activities within the international obligations in the area of water use

**Ministry of Sea, Transport, and Infrastructure** [http://www.mppi.hr/] – performs administrative, professional, and other activities related to the organization of strategic infrastructure projects and investment programs of special importance to the Republic of Croatia (water supply, wastewater sewerage, etc.) which are entirely or partially financed from the State Budget, coordinates the activities of other subjects in the construction of such facilities, monitors and controls the investments, and performs professional activities
related to the commencement, coordination, and monitoring of activities regulated by acts and regulations that govern the development of islands.

At a local level, there are a relatively large number (143) of municipal companies responsible for public water supply in Croatia; similarly, public wastewater systems are managed by 130 public utility (municipal) companies, some of which are also responsible for water supply. The owners of these companies are local self-government units.

12. CURRENT STATUS AND OPPORTUNITIES IN WATER MANAGEMENT SECTOR

Household wastewater disposal falls under the administrative competence of the local government authorities (municipalities). All major Croatian towns have a sewage system for the collection of municipal wastewater in place; wastewater treatment plants are present and functioning to varying degrees. Studies of Croatian Waters (Hrvatske Vode, www.voda.hr) describe the current situation and the needs for the development and construction of wastewater treatment facilities in Croatia. In the process of achieving EU standards in the field of household wastewater treatment, additional funds need to be raised and allocated.

Industrial wastewater treatment and the condition of treatment plants are not at the same level of development in the Croatian industry.

Major companies have more developed wastewater treatment facilities, but the majority of industry lacks the necessary funds for investments in modern equipment. In this field, future investments in the development and construction of equipment in accordance with EU standards will be needed.

Priorities of the Croatian Government and plans for development and construction of Wastewater treatment plants have not been defined entirely yet but they will be completed in the process of accession to the EU and harmonized with EU standards.

13. COMPETITION AND MARKET DEMAND

German, Austrian and French companies have a long history of cooperation with the Republic of Croatia in major infrastructure projects. The market demand consists on water pumps, separators, pipes, filters, bio-filters, sludge treatment equipment.
14. DOMESTIC SOURCES

The Act on Financing Water Management regulates the sources of funding for activities within the water management system, the manner of determining individual responsibility and collection of charges, and other issues concerning the allocation of funds. As water and wastewater projects are strategic capital investments, it is necessary to provide partial financing from the national budget and the budgets of units of local self-government, from other domestic sources and from abroad. To this end, Croatian government established The Environmental Protection and Energy Efficiency Fund (www.fzoeu.hr) in 2004.

The Fund was established to finance the preparation, implementation and development of programs, projects and similar activities concerned with the preservation, sustainable utilization and improvement of the environment, as well as with energy efficiency and the use of renewable sources of energy. The Fund grants money to legal entities and persons for programs, projects and other activities as defined in the Environmental Protection and Energy Efficiency Fund Act.

The financing takes the form of loans, subsidies, financial aids and grants. The funds are distributed on the basis of invitations for proposals. The Fund resources for financing of projects and programs are collected from permanent sources, i.e. the charges and contributions paid by the polluters and users of environment, interest on loans, donations, money from international bilateral and multilateral co-operation in onshore joint ventures, as well as the revenues from the national budget, budgets of the local self-government and local administration and self-government units for specific programs and purposes, from donations, service fees, sales of shares, equity capital, rights and things owned by the Croatian Privatization Fund i.e. the Republic of Croatia and from other sources.

Croatian Waters (www.voda.hr), a public utility company, plays a very important role in financing water supply, sewage and wastewater treatment projects. There is a series of public revenues from waters, i.e. water management contribution, charge on water use, charge for water protection, charge for sand and gravel extraction, basin water management charge, and a special charge investing in land improvement and drainage systems (to local authorities). The wastewater and sewage non-compliance fees are imposed for non-compliance with the conditions prescribed to protect water against pollution.

All water charges are collected by the water agency, Croatian Waters. The overall revenue from these charges is around 70 per cent of Croatian Waters total revenues.

Water management is the second priority in Croatia, after waste management.

Croatia needs to protect water resources by advancing water supply systems and waste water management, as a whole, by the following measures:

– Establishment of water supply systems and networks
– Building of installations for waste water purification from households and industry, as well as improvement of existing sewage

### 14.1 PROJECTS IN IMPLEMENTATION

1. Project Meandar – [http://www.voda.hr](http://www.voda.hr)
2. Project Twinning - [http://www.voda.hr](http://www.voda.hr)

* Projects Meander and Twinning - When you press on the link, please go on PROJEKTI and press MEĐUNARODNI PROJEKTI.

3. Project – Municipal water financing facility ([http://fvki.voda.hr/home.html](http://fvki.voda.hr/home.html))

4. Jadran project ([http://old.voda.hr/jadranskiprojekt-o-projektu](http://old.voda.hr/jadranskiprojekt-o-projektu) )
   ([http://www.voda.hr/hr/jadranski-projekt](http://www.voda.hr/hr/jadranski-projekt))

The Jadran (Adriatic) project is a multi-annual project whose goal is to protect water from contamination. The International Bank for Reconstruction and Development (IBRD) is involved and supports this project. The Project will act in: Cres, Krk, Lošinj, Medulin, Novigrad, Opatija, Pula, Rab, Rijeka-Grobnik, Kaštela, Zadar, Betina, Murter, Dugi Rat, Hvar, Metković, Sukošan-Bibinje, Vela Luka and Dubrovnik.

For further information regarding this project please use the links provided. Projects are not in English, but you can translate them by using Google translation (translation from Croatian into English is rather good).

Moreover, see the Croatian Water Pollution Control Society ([http://www.hdzv.hr/](http://www.hdzv.hr/)).
15. USEFUL LINKS

EFFLUENT MONITORING SERVICES

KOMUNALIJE doo
komunalije@vu.t-com.hr
http://www.komunalije-sumus.com.hr

VARKOM dd
info@varkom.com
http://www.varkom.hr

ZAGREBAČKI HOLDING doo
info@zgh.hr
http://www.zgh.hr

RIVER OXYGENATION CONTRACTORS

KOMUNALIJE doo
komunalije@vu.t-com.hr
http://www.komunalije-sumus.com.hr

VARKOM dd
info@varkom.com
http://www.varkom.hr

SEWAGE WATER COLLECTION AND DISPOSAL CONTRACTORS

KOMUNALIJE doo
komunalije@vu.t-com.hr
http://www.komunalije-sumus.com.hr

VARKOM dd
info@varkom.com
http://www.varkom.hr
WASTE WATER TREATMENT SYSTEMS- DISTRIBUTORS

MAJ LABIN doo
info@prvimaj.hr
http://prvimaj.hr

AQUAPUR doo
vodaizrak@aquapur.hr
www.aquapur.hr

BORPLASTIKA doo
bor-plastika@bor-plastika.hr
https://www.bor-plastika.hr

DOMES doo
domes@domes.hr
http://www.domes.hr

ETAL. doo
etal@etal.hr
http://www.etal.hr

ECOLAND doo
ecoland@ecoland.hr
http://www.ecoland.hr

EKO-VODA doo
eko.voda@vip.hr
http://www.eko-voda.hr

FELLER doo
feller@feller.hr
http://www.feller.hr

IMPEKS Bubnjari doo
impeks@impeks.hr
http://www.impeks.hr
TEKIJA doo
info@tekija.hr
http://www.tekija.hr

WASTE WATER TREATMENT SYSTEMS-MANUFACTURERS

CWG doo
info@cwg.hr
http://cwg.hr

INTERPLAN doo
info@interplan.hr
http://www.interplan.hr

TEHNIX doo
technix@tehnix.com
http://www.tehnix.hr

DRAINAGE, SEWERAGE AND TRADE EFFLUENT CONSULTANTS

CNM & CO. doo
cnm@rit-com.hr
http://www.cnm.hr

EKONERG HOLDING doo
ekonerg@ekonerg.hr

ELEKTROPROJEKT dd
ured.gd@elektroprojekt.hr
http://www.elektroprojekt.hr

HIDROPROJEKT-ING doo
info@hp-ing.hr
http://www.hp-ing.hr
IND-EKO doo
ind-eko@ri.t-com.hr
http://www.ind-eko.hr

MEĐIMURSKO VODE doo
voda@medimurske-vode.hr, medimurske-vode@ckt-com.hr
http://www.medimurske-vode.hr

OIKON doo
oikon@oikon.hr
http://www.oikon.hr

SUN ARH doo
sunarh@sunarh.hr
http://www.sunarh.hr

TEHNIKA dd
davorin.popovic@tehnika.hr
http://www.tehnika.hr

VODODRAGNJA OSIJEK dd
vodogradnja-os@os.t-com.hr, vodogradnja-osijek@hi.t-com.hr
http://www.vodogradnja-osijek.hr

VODOPRIVREDNO-PROJEKTNI BIRO dd
vpb@vpb.hr
http://www.vpb.hr

VODOVOD I ODVODNJA doo
vodovod.sibenik@si.t-com.hr, vodovodsi@net.hr
http://www.vio.hr

ZAGREBACKI HOLDING doo
vodovod.sibenik@si.t-com.hr, vodovodsi@net.hr
http://www.zgh.hr/
Waste and water management in Croatia

MEĐIMURSKE VODE doo
voda@medjimurske-vode.hr, medjimurske-vode@ck.t-com.hr
http://www.medjimurske-vode.hr

MIV dd
miv@varazdin.com, miv@miv.hr
http://www.miv.hr

OIKON doo
oikon@oikon.hr
http://www.oikon.hr

PASTOR EKOLOGIJA doo
http://www.pastor-group.com

RAI. doo
info@rai.hr
http://www.rai.hr

TEH PROJEKT HIDRO doo
teh-projekt-hidro@ri.t-com.hr
http://www.tehprojekt-hidro.hr

TRAMES doo
trames@du.t-com.hr
http://www.trames-consultants.hr
Website is under construction

VODOPRIVREDA ZAGREB dd
vodoprivreda07@vzg.hr
http://www.vzg.hr

VODOPRIVREDNO-PROJEKTNI BIRO dd
vpb@vpb.hr
http://www.vpb.hr
ZAGREBAČKI HOLDING doo
tvrtka@vio.hr
http://www.vio.hr

Water treatment

CWG d.o.o.
mario@cwg.hr info@cwg.hr
www.cwg.hr

Feller d.o.o.
feller@feller.hr
www.feller.hr

Nobel Corporation d.o.o.
marko.kozul@corporation.com
www.nobelcorporation.hr

Petrokov d.o.o.
petrokov@petrokov.hr
www.petrokov.hr

Fero-Term d.o.o.
drazen@fero-term.hr
www.fero-term.hr

Domes d.o.o.
domes@domes.hr
www.domes.hr

Acquamarin d.o.o.
robert.tomic@acquamarin.hr
www.acquamarin.hr

Impeks bubenjaci d.o.o.
impeks@impeks.hr
www.impeks.hr
Aqua d.o.o.
info@aqua.hr
www.aqua.hr

Aqua Pri-me d.o.o.
info@aquaprime.hr
www.mesec.hr

3-m d.o.o.
martina@3-m.hr
www.3-m.hr

DSK d.o.o.
suzana@dsk.hr
www.dsk.hr

Bis grad d.o.o.
info@bisgrad.com
www.tvrtke.hr/bisgrad

Aqua pur d.o.o.
josip@aquapur.hr
www.aquapur.hr

Hidrovoda Lipincic d.o.o.
office@lipincic.com
www.lipincic.com

Erwo d.o.o.
erwo@erwo.hr
www.erwo.hr

Nirosta d.o.o.
davor.drzavljевич@nirosta.hr
www.nirosta.hr

Waste and water management in Croatia
Aquaform d.o.o.
info@aquaform.hr
https://www.emajstor.hr/aqua-form

Aquachem d.o.o.
info@aquachem.hr
www.aquachem.hr

WATER PURIFICATION PLANT INSTALLATION CONTRACTORS

INSTALOGRAD doo
https://www.instalograd-promet.hr

MEĐIMURJE GRADITELJISTVO doo
info@m-g.hr
https://m-g.hr

OPATIJA INZENJERING doo
http://www.opatija-inzenjering.com

TEHNOMEHANIKA doo
tehnomehanika-ri@ri.t-com.hr
http://www.tehnomehanika.hr

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